M^CLAREN TRAFFIC ENGINEERING

Address: Shop 7, 720 Old Princes Highway Sutherland NSW 2232
Postal: P.O Box 66 Sutherland NSW 1499

Telephone: +61 2 8355 2440
Fax: +61 2 9521 7199
Web: www.mclarentraffic.com.au
Email: admin@mclarentraffic.com.au

Division of RAMTRANS Australia ABN: 45067491678 RPEQ: 19457

Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

10 February 2020 Reference: 190701.02FA

PMDL
17/124 Walker Street,
North Sydney,
NSW 2060 Australia
Attention: Tim Williams

SUPPLEMENTARY TRAFFIC ADVICE FOR
THE PROPOSED SAINTS PETER AND PAUL ASSYRIAN PRIMARY SCHOOL
AT 17 - 19 KOSOVICH PLACE, CECIL PARK, 2178

Dear Tim,

Reference is made to your request to provide supplementary traffic advice for the proposed Saints Peter and Paul Assyrian Primary School at 17 - 19 Kosovich Place, Cecil Park, 2178 following the meeting with Transport for NSW on 13 January 2020. The meeting minutes provided by both Willow Tree Planning and Transport for NSW are reproduced in **Annexure A** for reference. This letter should be read in conjunction with the Traffic and Parking Impact Assessment by *M^CLaren Traffic Engineering* dated 4 September 2018 (M^CLaren Report) and the subsequent letters by *M^CLaren Traffic Engineering* dated 24 April 2019 and 15 November 2019.

The key points agreed during the meeting on 13 January can be summarised as follows:

- A roundabout treatment at the intersection of Kosovich Place and Wallgrove Road is not feasible.
- The only feasible treatment at the intersection is a priority-controlled intersection.
- The priority-controlled intersection must feature the following:
    - Overall design for the largest vehicle to enter and exit Kosovich Place, being a 12.5m long Heavy Rigid Vehicle;
    - A channelised right-turn treatment for vehicles entering Kosovich Place from the north;
    - A ban on right turns out of Kosovich Place, with a concrete island designed to physically enforce the restriction;
    - A left-turn deceleration lane for vehicles approaching Kosovich Place from the south.

1 Revised Design

The revised intersection design is depicted in **Annexure B** and includes the following features:

- A 26.6m long auxiliary lane providing for the storage of vehicles waiting to turn right from Wallgrove Road into Kosovich Place:
    - It is noted that this does not include the taper length of 18m.
    - This length is the longest lane length that can be accommodated considering the proximity of the roundabout to the north and the narrow culvert across Ropes Creek.
    - A 26.6 long lane is sufficient to accommodate the 98th percentile queue predicted by SIDRA analysis sensitivity testing and can accommodate two 12.5m long Heavy Rigid Vehicles.
    - It should be noted that traffic exiting the roundabout travels significantly slower than the 80km/h speed restriction and deceleration facilities are not required. Southbound vehicles intending to enter Kosovich Place will not significantly accelerate after exiting the roundabout and will have ample room in which to brake safely for the right turn. As depicted in **Figure 1**, vehicles exiting the roundabout will have clear vision of vehicles ahead intending to turn right into Kosovich Place.

FIGURE 1: DRIVERS VIEWPOINT – EXITING THE ROUNDABOUT SOUTHBOUND

- A 100m long (including taper) auxiliary lane providing for the deceleration of vehicles turning left into Kosovich Place.
- "No Right Turn" and "Left Only" signage, complemented by a concrete island, restricting right turns out of Kosovich Place.
- Lane and shoulder widths generally matching the existing geometry of Wallgrove Road;
- All intersection turns designed to accommodate a 12.5m long Heavy Rigid Vehicle, as depicted on the swept path tests reproduced in **Annexure C**.

2 SIDRA Intersection Assessment

The performance of the proposed intersection treatment has been considered using SIDRA Intersection 8.0 in a network with the roundabout at Wallgrove Road/Villiers Road under the following traffic volume scenarios:

- Existing Volumes + Stage 1 of Development;
- Existing Volumes + 10 Year Growth + Final Stage of Development

The existing traffic network has also been tested under "Existing" and "Existing + 10 Year Growth" scenarios to provide a comparison. The traffic surveys upon which the existing volumes are based are provided in **Annexure D**, the extract from the M^{C}Laren Report outlining traffic generation & distribution is provided in **Annexure E** and the growth plots provided by RMS are provided in **Annexure F**.

The results of the SIDRA analysis are summarised in **Table 2** and provided in detail in **Annexure G**.

As shown, the proposed treatment will perform with a high level of efficiency, with a level of service of "A" or "B" maintained for all approaches. 95th percentile queue lengths in the proposed auxiliary lanes are insignificant, such that it is expected that there will be no impact on through traffic along Wallgrove Road as a result of the proposed treatments.

2.1.1 Queue Lengths in Channelised Right-Turn Lane

To test the sensitivity of the queue length in the channelised right turn lane, sensitivity testing has been undertaken for the AM peak hour (the worse peak) which assumes that 70% of the traffic entering the site will do so from the north. The results of the SIDRA analysis indicate that the following 98th percentile queue lengths as summarised in **Table 1** will occur in the auxiliary right-turn lane.

TABLE 1:QUEUE LENGTHS IN AUXILIARY TURN LANE

Scenario	Peak Hour	98th Percentile Queue (veh)	98th Percentile Queue (m)
Stage 1 Development	AM	0.5	3.4
	PM	0.2	1.3
10 Year Growth + Final Development	AM	1.1	7.7
	PM	0.4	2.8
10 Year Growth + Final Development – Sensitivity Test	AM	2.7	19.5

As shown, the maximum 98th percentile queue length indicated by the SIDRA analysis is 7.7m in the weekday AM case for the final development (including 10Y passive growth). The sensitivity test shows that even with a 70% loading of the site's incoming traffic, the queue in the right-turn auxiliary lane will not exceed 19.5m length.

TABLE 2: SIDRA INTERSECTION 8.0 RESULTS

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/vehicle)	Level of Service[3]	Control Type	Worst Movement	98th Percentile Queue
EXISTING VOLUMES							
Wallgrove Road / Kosovich Place	AM	0.49	0.1 (Worst: 17.3)	**N/A** (Worst: B)	Give Way	RT from Kosovich Place (E)	0 veh (0.2m) Wallgrove Road (S)
	PM	0.51	0.1 (Worst: (Worst: 19.4)	**N/A** (Worst: B)		RT from Kosovich Place (E)	0 veh (0.3m) Wallgrove Road (S)
Wallgrove Road / Villiers Road	AM	0.37	4.1 (Worst: 10.8)	**A** (Worst: A)	Roundabout	UT from Wallgrove Road (S)	1.7 veh (12.2m) Wallgrove Road (N)
	PM	0.44	4.1 (Worst: 10.8)	**A** (Worst: A)		UT from Wallgrove Road (S)	3.5 veh (24.4m) Wallgrove Road (N)
EXISTING VOLUMES + 10 YEAR GROWTH							
Wallgrove Road / Kosovich Place	AM	0.48	0.1 (Worst: 17.2)	**N/A** (Worst: B)	Give Way	RT from Kosovich Place (E)	0 veh (0.2m) Wallgrove Road (S)
	PM	0.52	0.1 (Worst: 20.7)	**N/A** (Worst: B)		RT from Kosovich Place (E)	0 veh (0.4m) Wallgrove Road (S)
Wallgrove Road / Villiers Road	AM	0.53	4.1 (Worst: 10.8)	**A** (Worst: A)	Roundabout	UT from Wallgrove Road (S)	1.3 veh (9.8m) Wallgrove Road (N)
	PM	0.57	4.2 (Worst: 10.8)	**A** (Worst: A)		UT from Wallgrove Road (S)	5.6 veh (41.7m) Wallgrove Road (N)
EXISTING VOLUMES + STAGE 1 DEVELOPMENT							
Wallgrove Road / Kosovich Place	AM	0.49	1.9 (Worst: 16.3)	**N/A** (Worst: B)	Give Way	LT from Kosovich Place (E)	1.4 veh (10.1m) Kosovich Place (E)
	PM	0.57	1 (Worst: 7.8)	**N/A** (Worst: A)		RT from Wallgrove Road (N)	0.6 veh (4.4m) Kosovich Place (E)
Wallgrove Road / Villiers Road	AM	0.60	4.6 (Worst: 10.8)	**A** (Worst: A)	Roundabout	UT from Wallgrove Road (S)	1.8 veh (13.7m) Wallgrove Road (N)
	PM	0.68	5 (Worst: 10.8)	**A** (Worst: A)		UT from Wallgrove Road (S)	7.9 veh (58.7m) Wallgrove Road (N)
EXISTING VOLUMES + 10 YEAR GROWTH + FINAL DEVELOPMENT							
Wallgrove Road / Kosovich Place	AM	0.79	5.7 (Worst: 27.1)	**N/A** (Worst: B)	Give Way	LT from Kosovich Place (E)	5.7 veh (41.3m) Kosovich Place (E)
	PM	0.67	2.3 (Worst: 7.6)	**N/A** (Worst: A)		LT from Kosovich Place (E)	2 veh (14.7m) Kosovich Place (E)
Wallgrove Road / Villiers Road	AM	0.69	5.1 (Worst: 10.8)	**A** (Worst: A)	Roundabout	UT from Wallgrove Road (S)	2.5 veh (19.6m) Wallgrove Road (N)
	PM	0.83	7.4 (Worst: 10.8)	**A** (Worst: A)		UT from Wallgrove Road (S)	14.7 veh (109.4m) Wallgrove Road (N)
EXISTING VOLUMES + 10 YEAR GROWTH + FINAL DEVELOPMENT – Sensitivity Test							
Wallgrove Road / Kosovich Place	AM	0.79	6.3 (Worst: 27.1)	**N/A** (Worst: B)	Give Way	LT from Kosovich Place (E)	5.7 veh (41.3m) Kosovich Place (E)
Wallgrove Road / Villiers Road	AM	0.69	5.2 (Worst: 10.8)	**A** (Worst: A)	Roundabout	UT from Wallgrove Road (S)	3.6 veh (27.7m) Wallgrove Road (N)

3 Existing Traffic Characteristics

To verify the results of the SIDRA analysis, automatic traffic count surveys were undertaken in 2018 between 26 July and 1 August, with the counter placed approximately at the location of the Kosovich Place intersection along Wallgrove Road. By processing the raw data produced, it is possible to determine the number and length of gaps in the traffic stream observed by the counter. The results of this analysis are shown in **Table 3** for the key times (8:30AM to 9:30AM and 2:30PM to 3:30PM).

TABLE 3: GAP CHARACTERISTICS – 4 SECOND CRITICAL GAP, 2 SECOND FOLLOW UP

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Date	**30/07/2018**	**31/07/2018**	**1/08/2018**	**26/07/2018**	**27/07/2018**
8:30 – 9:30	150 (350)	137 (329)	141 (374)	127 (331)	121 (348)
14:30 – 15:30	178 (408)	201 (424)	187 (397)	175 (409)	219 (459)

Notes: The number of individual gaps greater than 5 seconds observed is shown, followed by the number of vehicles in total that could make turns if the follow-up headway of 3 seconds is considered.

Further, using this information it is possible to estimate the average delay for vehicles attempting to make a turn by dividing the number of seconds in an hour by the capacity of the movement (shown in brackets). For example, on Monday 30/07/2018 in the morning peak hour, there was capacity for 350 vehicles, therefore the average delay would be 3600/350 = 10.3 seconds (corresponding to a Level of Service of A). The results of this analysis are provided in **Table 4**.

TABLE 4: GAP CHARACTERISTICS – AVERAGE DELAY AND LEVEL OF SERVICE

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Date	**30/07/2018**	**31/07/2018**	**1/08/2018**	**26/07/2018**	**27/07/2018**
8:30 – 9:30	10 (A)	11 (A)	10 (A)	11 (A)	10 (A)
14:30 – 15:30	9 (A)	8 (A)	9 (A)	9 (A)	8 (A)

It is noted that the average delays presented in **Table 4** cannot be used in isolation as a measure of turning movement performance, but do provide an indicative level of service based on measured gap characteristics which can be used for calibration purposes. The SIDRA results reflect that right turn movements from Wallgrove Road into Kosovich Place have a Level of Service of A, which is also reflected by the analysis of the gap data.

On this basis, the SIDRA results are likely to correctly reflect the delay characteristics of the right turn movement from Wallgrove Road into Kosovich Place.

4 Conclusions

In consideration of the above it can be concluded that:

- The proposed intersection design will meet the RMS and AUSTROADS requirements in terms of both traffic flow and safety;
- Any non-compliances with the strict Austroads requirements are justified based on the speeds and sight distances available to drivers;
- The SIDRA analysis indicates that queue lengths in the auxiliary right turn lane will not exceed the capacity of that lane, even with an unrealistic 70% of traffic entering the site from that direction.

In view of the foregoing, it is recommended that the alternative intersection layout suggested, as depicted in **Annexure B**, is fully supportable.

Please contact the undersigned should you require further information or assistance.

Yours faithfully
McLaren Traffic Engineering

Tom Steal
Senior Traffic Engineer
BE Civil AMAITPM MIEAust
RMS Accredited Level 1 Road Safety Auditor
RMS Accredited Work Zone Traffic Management Plan Designer and Inspector

ANNEXURE A: MEETING MINUTES

(6 SHEETS)

ANNEXURE B: PROPOSED INTERSECTION TREATMENT
(2 SHEETS)

ANNEXURE C: SWEPT PATH TESTING

(1 SHEET)

ANNEXURE D: TRAFFIC SURVEY DATA

(1 SHEET)

ANNEXURE E: TRAFFIC GENERATION EXTRACT
(2 SHEETS)

ANNEXURE F: RMS GROWTH PLOTS
(1 SHEETS)

ANNEXURE G: SIDRA RESULTS

(40 SHEETS)